

# (12) UK Patent Application (19) GB (11) 2 109 771 A

(21) Application No 8232635

(22) Date of filing 16 Nov 1982

(30) Priority data

(31) 8134872

(32) 19 Nov 1981

(33) United Kingdom (GB)

(43) Application published

8 Jun 1983

(51) INT CL<sup>3</sup>

B65D 33/24 B31B 41/14

B65D 33/34

(52) Domestic classification

B8K 2G2 2H1 2K1 BA

B5D SS1

(56) Documents cited

GB 1600632

GB 1444326

US 3380481

US 3226787

US 0028969

(58) Field of search

B8K

B5D

(71) Applicant

Nigel Ervine Claxton,

High Tree Lodge,

Buck Street,

Challock,

Nr Ashford,

Kent

(72) Inventor

Nigel Ervine Claxton

(74) Agent and/or address for

service,

Stevens, Hewlett and

Perkins,

5 Quality Court,

Chancery Lane,

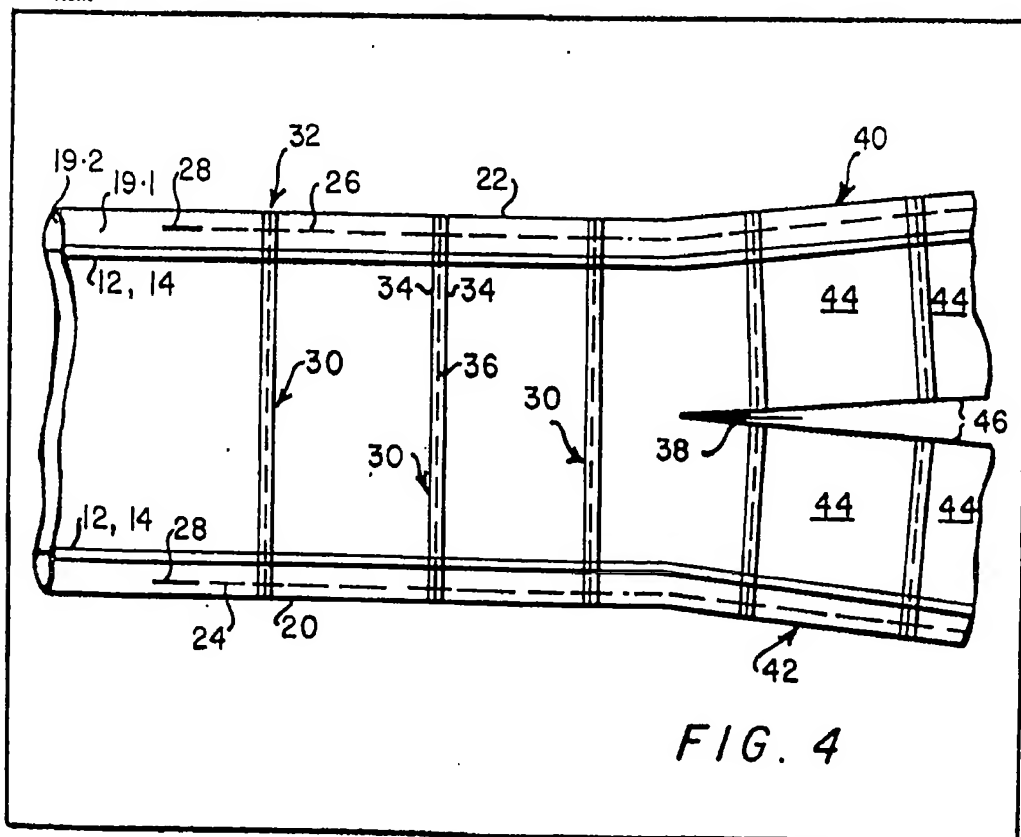
London,

WC2A 1HZ

(54) Bags and the manufacture of bags

(57) A strip of tamper proof, reclosable bags 44 comprises two plies 19.1, 19.2 of plastics sheet material secured to one another by welding along transverse zones by folds 20, 22 along their edges. Adjacent bags are connected along lines of

perforations. The plies are provided with interengageable male/female rib formations 12, 14 adjacent the folds 20, 22, and a line of weakening is formed by perforations 24, 26 in the plies between the fold and the male/female rib formations to form an edge portion which can be removed by tearing along the line of weakening. The plies are slit at 38 to form openings 46 through which the bags can be filled and thereafter sealed. Prior to opening the bag, the edge portion is torn off. The bag can then be opened to provide access to the contents by disengaging the rib formations 12, 14, and reclosed by re-engaging the rib formations. The bags are produced in strip form and remain in strip form until required for use.



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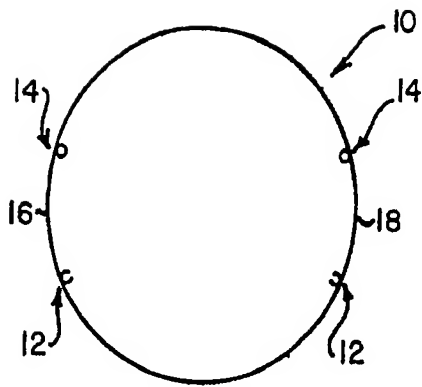


FIG. 1

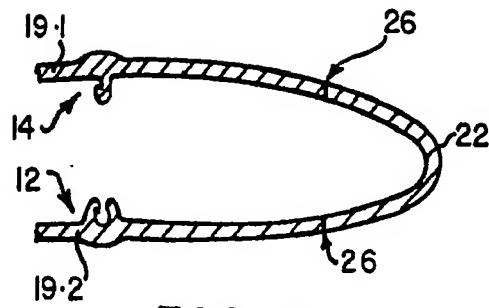


FIG. 3

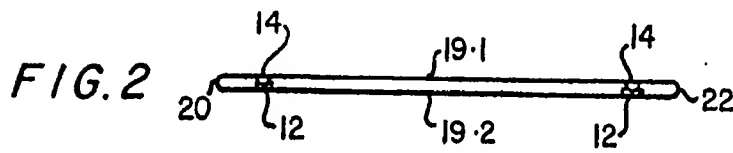


FIG. 2

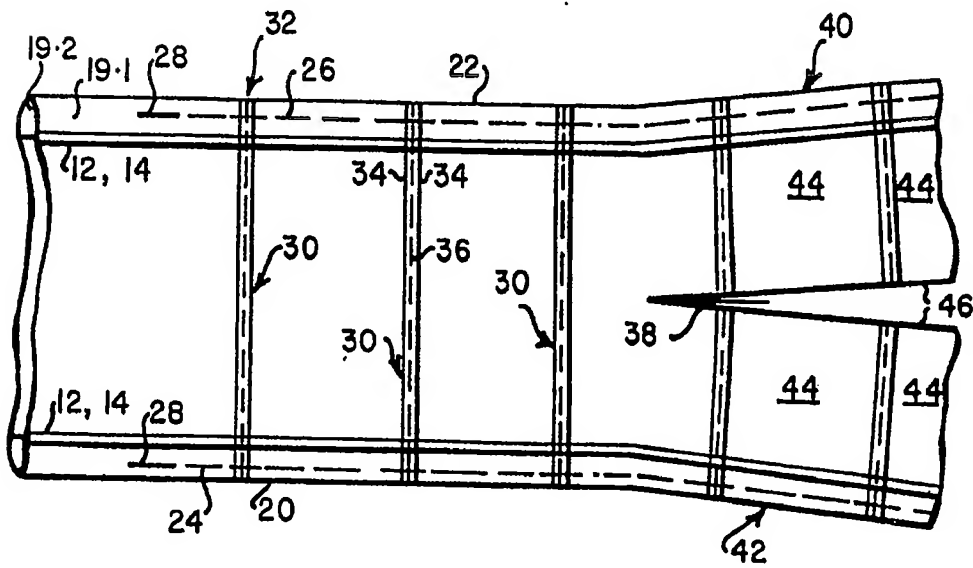


FIG. 4

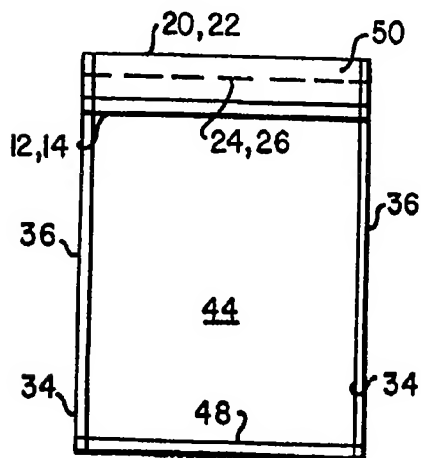


FIG. 5

## SPECIFICATION

## Bags and the manufacture of bags

This invention relates to a strip of bags, and to a method of manufacturing a strip of bags.

- 5 According to one aspect of the present invention there is provided a strip of bags which comprises two plies of sheet material in elongate strip form secured to one another along one longitudinal edge thereof and being non-secured  
10 along the other longitudinal edge thereof, the plies further being secured to one another in longitudinally spaced, transversely extending zones across the width of the plies, the plies being provided with longitudinally extending inter-engageable male/female rib formations adjacent  
15 said one longitudinal edge, there being a longitudinally extending line of weakness in the plies between said one longitudinal edge and the interengageable male/female rib formations to  
20 enable that part of the plies between said one longitudinal edge and the line of weakness to be torn off, and there being a transverse line of weakness in the plies in each of said zones.

- The connection between the two plies along  
25 said one longitudinal edge thereof may be constituted by a fold.

The longitudinally extending line of weakness may be constituted by a line of perforations or by a thinning down in thickness of the plies.

- 30 The transverse lines of weakness may each be constituted by a line of perforations.

According to another aspect of the present invention there is provided a method of manufacturing a strip of bags, which method  
35 comprises:

extruding a tube of plastics sheet material with integral releasable closure means;

- 40 flattening the tube to provide two folds and to bring the closure means into cooperating relationship;  
perforating the tube along a line which is between one fold and the closure means, thereby to provide an edge portion which can be removed by tearing along said line;

- 45 transversely welding and perforating the tube at longitudinally spaced intervals to provide a series of individual bags joined to one another at the transverse perforations; and

- 50 slitting the tube to provide an open mouth parallel to the closure means but on the opposite side thereof to said line of perforations.

The tube may be extruded with two sets of releasable closure means, said slitting taking place between one set of closure means and the  
55 other, thereby to provide, from one tube, two strips of bags.

In one form of the invention, the two plies of the flattened tube may be slit simultaneously along a line midway between the folds.

- 60 In another form of the invention, the tube is opened before slitting, slitting of the plies taking place along lines which are off-set with respect to one another.

The tube can be extruded with one set of

- 65 releasable closure means.

According to a further aspect of the present invention there is provided a method of manufacturing a strip of bags, which method comprises:

- 70 extruding sheet plastics material with integral releasable closure means;

folding the sheet to bring the closure means into cooperating relationship;

- 75 forming the sheet with a line of weakness between the fold and the closure means thereby to provide an edge portion which can be removed by tearing along said line and

- 80 transversely welding and perforating the folded sheet at longitudinally spaced intervals to provide a series of individual bags joined to one another at the transverse perforations.

The line of weakness can be formed by perforating the sheet or by extruding it with zones which are thinner than the remainder of the sheet.

- 85 For a better understanding of the present invention, and to show how the same may be carried into effect reference will now be made, by way of example, to the accompanying drawing in which:—

- 90 Figure 1 is a section through an extruded tube;

Figure 2 illustrates the tube of Figure 1 in flattened condition with male and female rib formations engaged;

- 95 Figure 3 shows part of the tube in more detail with the male and female rib formations disengaged;

Figure 4 is a diagrammatic plan view of the flattened tube of Figure 2 and illustrates a number of steps in the production of bags; and

- 100 Figure 5 illustrates one of the bags.

Referring firstly to Figure 1, the reference numeral 10 designates a tube of plastics sheet material as extruded from the generally annular extrusion slit of an extrusion die. The tube is  
105 extruded with two female rib formations 12 and two male rib formations 14. The male rib formations are shaped to 'snap-engage' with the corresponding female rib formations.

- The extruded tube is flattened along the lines designated 16 and 18 in Figure 1, this producing two plies 19.1 and 19.2 which are connected to one another along two folds 20 and 22 (Figure 2), and causing each male formation 14 to snap into the corresponding female formation 12. Figure 3  
115 shows, to a larger scale, one edge zone of the flattened tube.

The flattened tube is then perforated along two lines 24 and 26 by means of two perforating wheels 28 (Figure 4). The lines 24 and 26 are close to the folds 20, 22 and between the folds 20, 22 and the adjacent male and female formations 12, 14.

- The next stage after perforating longitudinally is transversely to weld and perforate the flattened tube along a plurality of zones 30. The zones 30 are equally spaced apart in the direction of the length of the flattened tube and transverse welding and perforating can occur at station 32 adjacent the wheels 28. At each zone 30 there

are two lines of welding 34 with a line of perforations 36 between adjacent pairs of lines of welding 34. Alternatively, there may be a broader line of welding bisected by a line of perforations.

- 5 The final stage in the manufacturing procedure is the slitting of the flattened tube along its centre line by means of a slitter diagrammatically shown at 38. The end result is thus two strips designated 40 and 42, each of which comprises a plurality of bags 44 which are open along their edges 46. Each bag 44 is joined along the transversely extending zones 30 to two adjacent bags 44. The remaining edge of each bag is constituted by one of the folds 20, 22 and is thus closed.
- 10 While still attached to other bags along the lines of perforations 36, each bag can be filled through the mouth which is created along the edge 46 when the two plies 19.1, 19.2 are separated. Filling can be mechanically or by hand.
- 20 Once filled, the bag is sealed by means of a further weld line or by the application of adhesive. Welding or the application of adhesive takes place along the line 48 (Figure 5). If adhesive is used then this is such that the bag must be damaged to enable it to be opened again. After filling, the bags can be separated from one another along the lines of perforations 36. Where the bags are to be hand filled, they can be detached from the web first and filled subsequently.
- 30 When it is desired to gain access to the contents of one of the bags, the strip-like edge portion 50 (Figure 5) is removed by tearing along the perforated line 24 or 26. Once this has been done, the male and female rib formations 12, 14 can be pulled apart to enable access to be had to the interior of the bag. The bag can be re-closed after use by reinserting the male formation 14 in the groove of the female formation 12.
- 35 In a modified form of manufacture there are two slitters 38 for slitting the extruded tube at two approximately diametrically opposed locations. For example, one slitter 38 can be midway between the pairs of male and female formations 12, 14. The other slitter 38 can be closer to one pair of male and female formations 12, 14 than it is to the other pair of male and female formations 12, 14. The effect of this is to make one of the plies of each bag somewhat longer, measured from the folded edge of the bag, than is the other ply. Thus a strip-like portion of one ply of each bag projects beyond the free edge of the other ply of the bag, thereby to form a flap. This flap can be folded over so as to overlap with the shorter ply and provide an area at which the bag can conveniently be closed either by the application of heat, by ultrasonic welding, or by the application of adhesive.
- 55 While a specific sequence of operations has been described, it will be understood that the order in which the operations are carried out can be varied as desired.
- 60 Furthermore, while bags having two plies 19.1, 19.2 have been described, it will be appreciated that each such ply may itself be constituted by two or more layers. For example, each ply 19.1,

19.2 may be a co-extruded laminate and, if desired, one of the layers may be a barrier layer having suitable oxygen or other barrier properties.

- The lines of weakness which are formed by perforating using the wheels 28 can be replaced by lines of weakness formed when the tube is extruded. This can be achieved by extruding the tube with zones of lesser thickness at four locations. The thinned down zones after flattening of the tube, co-operate to form two weakened lines equivalent to the lines 24, 26.

The method of manufacture described is suitable where the bag size is such that the extruder is capable of extruding a tube of sufficient size to provide two strips 40, 42. However, if larger bags are to be produced then it is possible to extrude a tube with a single set of male and female formations 12, 14. Such a tube is slit at one location only and this slit gives rise to an open edge 46. The single line of weakness 24, 26 which is required can again be formed by perforating or thinning down the material during extrusion.

If desired, the plastics material can be extruded in sheet form with one or more sets of formations 12, 14 and then folded to bring the formations 12, 14 into cooperating relationship. Thereafter, the method of production is as described hereinbefore.

#### 95 Claims

1. A strip of bags which comprises two plies of sheet material in elongate strip form secured to one another along one longitudinal edge thereof and being non-secured along the other longitudinal edge thereof, the plies further being secured to one another in longitudinally spaced, transversely extending zones across the width of the plies, the plies being provided with longitudinally extending interengageable male/female rib formations adjacent said one longitudinal edge, there being a longitudinally extending line of weakness in the plies between said one longitudinal edge and the interengageable male/female rib formations to enable that part of the plies between said one longitudinal edge and the line of weakness to be torn off, and there being a transverse line of weakness in the plies in each of said zones.
2. A strip of bags as claimed in claim 1, wherein the connection between the two plies along said one longitudinal edge thereof is constituted by a fold.
3. A strip of bags as claimed in claim 1 or claim 2, wherein the longitudinally extending line of weakness is constituted by a line of perforations.
4. A strip of bags according to claim 1 or claim 2, wherein the longitudinally extending line of weakness is constituted by a thinning down in the thickness of each ply.
5. A strip of bags as claimed in any one of claims 1 to 4, wherein the transverse lines of weakness are each constituted by a line of perforations.

6. A method of manufacturing a strip of bags, which method comprises:  
 extruding a tube of plastics sheet material with integral releasable closure means  
 5 flattening the tube to provide two folds and to bring the closure means into cooperating relationship;  
 perforating the tube along a line which is between one fold and the closure means, thereby  
 10 to provide an edge portion which can be removed by tearing along said line;  
 transversely welding and perforating the tube at longitudinally spaced intervals to provide a series of individual bags joined to one another at  
 15 the transverse perforations; and  
 slitting the tube to provide an open mouth parallel to the closure means but on the opposite side thereof to said line of perforations.  
 7. A method as claimed in claim 6, wherein the  
 20 tube is extruded with two sets of releasable closure means, said slitting taking place between one set of closure means and the other, thereby to provide, from one tube, two strips of bags.  
 8. A method as claimed in claim 7, wherein the  
 25 two plies of the flattened tube are slit simultaneously along a line midway between the folds.  
 9. A method as claimed in claim 8, wherein the  
 30 tube is opened before slitting, and wherein slitting of the plies takes place along lines which are off-set with respect to one another.  
 10. A method as claimed in claim 6, wherein

- the tube is extruded with one set of releasable closure means.  
 35 11. A method of manufacturing a strip of bags, which method comprises:—  
 extruding sheet plastics material with integral releasable closure means;  
 folding the sheet to bring the closure means  
 40 into cooperating relationship;  
 forming the sheet with a line of weakness between the fold and the closure means thereby to provide an edge portion which can be removed by tearing along said line, and  
 45 transversely welding and perforating the folded sheet at longitudinally spaced intervals to provide a series of individual bags joined to one another at the transverse perforations.  
 12. A method as claimed in claim 11, wherein  
 50 said line of weakness is formed by perforating the sheet.  
 13. A method as claimed in claim 11, wherein said line of weakness is provided by extruding the sheet with zones which are thinner than the  
 55 remainder of the sheet.  
 14. A strip of bags substantially as herein described and illustrated.  
 15. A method of manufacturing a strip of bags, substantially as herein described.  
 60 16. A bag torn from a strip of bags as claimed in any one of claims 1 to 5 or 14.  
 17. A bag torn from a strip of bags manufactured as claimed in any one of claims 6 to 13 or 15.